

THE MINERAL INDUSTRY OF ICELAND

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Iceland's economy recovered from a mild recession in 2002 and registered a gross domestic product growth of 2.3% in 2003. Inflation was in check at 2.2%, and the unemployment rate was low at 3% (International Monetary Fund, 2003¹). The country has few identified mineral resources, although indigenous deposits of diatomite were mined. Abundant hydroelectric and hydrothermal power sources provided most of the country's energy needs. The hydroelectric power also helped expand its aluminum and ferrosilicon smelting industries. Among Iceland's important exports were aluminum and ferrosilicon (U.S. Department of State, 2004).

The Environmental Agency issued an operating permit for Alcoa Inc. of the United States' proposed 322,000-metric-ton-per-year (t/yr) Fjaröal primary aluminum smelter at Fjardabyggd in eastern Iceland. The permit established environmental operating conditions and emission limits for the plant. By using state-of-the-art technology, the plant was expected to achieve emission targets that were among the lowest in the world (Alcoa Inc., 2003§).

Alcoa chose Bechtel Group Inc. of the United States and its partner, Honnun, Rafhonnun, and VST of Iceland, to design and build the smelter. Design work started in the second half of 2003. Carbon anodes would not be manufactured, thus eliminating a source of sulfur dioxide, nitrogen oxide, and hydrocarbon and onsite disposal for spent pot linings. Compliance with all air- and water-quality standards in the European Union (EU) directives was scheduled for implementation in 2005 and 2010. Engineering procurement and project management functions would be performed by Bechtel (Metal-Pages, 2003§).

Construction of the \$1.1 billion Fjaröal smelter would begin in 2005 with commissioning scheduled for 2007. The smelter would more than double the country's existing aluminum smelting capacity of 258,000 t/yr, which included the Isal and Nordural plants in western Iceland. The smelter would create 450 permanent jobs and 300 jobs in related service industries (Mining Journal, 2003).

The Icelandic state-owned power group Landsvirkjun approved a \$611 million contract to supply the Fjaröal aluminum smelter with a total of 4,704 gigawatt hours of electricity during 40 years. The group's plans to construct the Karahnjúkar dam and a 690-megawatt-capacity powerplant met with strong opposition from environmentalists. Landsvirkjun chose Impregilo SpA of Italy to build the dam and tunnels for the hydroelectric powerplant. Four other companies that participated in the bids were NCC AB and Skanska AB of Sweden, Veidekke of Norway, and Vinci of France (Reuters, 2003§).

Expansion of the Nordural aluminum smelter capacity by Columbia Ventures Corp. of the United States to 180,000 t/yr from 90,000 t/yr was due to be completed by the end of 2005 but could be delayed by 6 months or longer because of new Government permitting requirements. Landsvirkjun and Columbia Ventures had signed a memorandum of understanding to supply power to the expanded smelter. Landsvirkjun planned to embark on a new hydroelectric power project in south-central Iceland where the smelter was located. The Government ruled, however, that the reservoir structure had to be changed and that an environmental impact study must be completed. Landsvirkjun would acquire 53% of the power for the smelter from another electricity provider that generated geothermal power (Metal Bulletin, 2003b). Two other producers, Orkuveita Reykjavíkur and Hitaveita Sudurnesja, also might provide power to the smelter.

Elkem A/S of Norway increased its stake in Icelandic Alloys Ltd. to 97.2% after buying the shares of private small investors. Elkem had increased its stake to 82.7% when it acquired the Government's 10.5% interest early in 2003. Icelandic Alloys had a plant capable of producing 120,000 t/yr of ferrosilicon (Metal Bulletin, 2003a).

Icelandic New Energy, in partnership with DaimlerChrysler, Norsk Hydro A/S, and the Royal Dutch/Shell Group, opened the world's first commercial hydrogen filling station in Reykjavík in April. Hydrogen for the station was produced by electrolyzing water using electricity generated from renewable energy. When used in a fuel cell, hydrogen is recombined with oxygen to produce water vapor; the combination generates electricity that runs the vehicle's electrical motor. The process produces no polluting emissions and results in a cleaner environment. Plans were also in place to test the fuel-cell-powered buses in nine European cities; the EU was supporting this project with \$24.2 million (Alexander's Gas & Oil Connections, 2003§).

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¹ References that include a section mark (§) are found in the Internet References Cited section.

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TABLE 1
ICELAND: ESTIMATED PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity	1999	2000	2001	2002	2003
Aluminum metal, primary ²	219,509 ³	224,439 ³	245,135 ³	263,700 ³	265,900 ³
Cement, hydraulic ⁴	131,292 ³	143,734 ³	125,169 ³	130,000	135,000
Diatomite	28,299 ³	27,614 ³	30,434 ³	31,000	30,000
Ferrosilicon	70,933 ³	70,000	111,948 ³	120,624 ^{r, 3}	115,000
Nitrogen, N content of ammonia	6,500	6,500	3,300 ³	-- ³	-- ³
Pumice and related volcanic material:					
Pumice	25,000	25,000	25,000	25,000	25,000
Scoria	500	500	500	500	500
Salt	4,000	4,000	4,500	4,500	4,500
Sand:					
Basaltic cubic meters	1,000	1,000	1,100	1,200	1,200
Calcareous, shell do.	80,000	80,000	80,000	80,000	80,000
Sand and gravel thousand cubic meters	3,600	4,000	4,000	4,200	4,200
Silica dust ⁵	11,628 ³	12,000	20,192 ³	20,000	21,000
Stone, crushed:					
Basaltic	90,000	95,000	95,000	95,000	96,000
Rhyolite cubic meters	16,500	17,000	17,000	18,000	18,000

^rRevised. -- Zero.

¹Table includes data available through June 3, 2004.

²Ingot and rolling billet production.

³Reported figure.

⁴Sales.

⁵Byproduct of ferrosilicon.